

BURNET (S. M.)

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(CHOKED DISC)

AND

SLOUGHING OF THE RIGHT CORNEA

ACCOMPANYING A SARCOMATOUS TUMOR ON
THE RIGHT SIDE OF THE BRAIN.

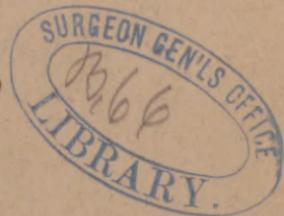
BY

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DOUBLE OPTIC NEURITIS (CHOKED DISC) AND SLOUGHING OF THE RIGHT CORNEA, ACCOM- PANYING A SARCOMATOUS TUMOR ON THE RIGHT SIDE OF THE BRAIN.

BY SWAN M. BURNETT, M.D., OF WASHINGTON, D. C.

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THERE are, perhaps, no two questions in ocular pathology in a more unsettled condition than those relating to the connection between lesions of the trigeminus and inflammation of the cornea, and the manner in which optic neuritis is produced by morbid growths in the cranial cavity.

Regarding the first of these questions, diametrically opposite views have been held by parties occupying equally high positions in the world of science, and all have professed to substantiate their position by that crucial test of all scientific inquiry—experiment.

In respect to the second question, that three distinct and widely differing theories are contended for, all with a certain show of plausibility, is conclusive proof that our knowledge on that subject is yet far from definite.

Under these circumstances, the thing to be desired is a further accumulation of facts, such as can only be obtained by the clinical observation of cases, as close and accurate as possible, combined with an examination of the appearances found *post mortem*.

The following case is offered as a contribution to the study of these two questions, after this manner:

During the latter part of July, 1876, I was requested by Dr. Robert Brazelton, of New Market, Tenn., to examine, ophthalmoscopically, a case of brain trouble, in regard to the nature of which he was in some

doubt. He suspected some complication on the part of the left eye, because the patient had been complaining latterly of defective vision on that side.

The *clinical history* of the case, traced as clearly as the circumstances and condition of the patient allowed, was kindly furnished me by Dr. B., and is as follows :

Shade Peck, a negro boy of 23 years, tall, spare-made, and of previous good health, while working in the Battle Creek coal mines, in January of this year, was seized with a violent pain in the lumbar region, extending thence down the left leg. In the course of a few weeks this pain subsided, but was followed by a dull, heavy aching in the back of the head. This gradually increased in its intensity, and was finally accompanied by nausea, vomiting, epileptic attacks, marked *left hemiplegia*, and paresis of the muscles and numbness of the *right* side of the face. The bowels were constipated ; appetite not materially impaired.

The treatment, instituted by the physician of the mines, was cathartics, mercury to ptyalism, and electricity.

When seen by Dr. B. for the first time, on the 16th of June, his condition was as follows : Much emaciated ; intellectual faculties dull, but in no manner deranged, memory being but little affected. He complains of an excruciating pain in the *left* side of the head, which is aggravated by tapping with the ends of the fingers ; muscular paresis and numbness on the *right* side of the face ; tongue protruded slowly and tremulously, but quite straight; impairment of hearing and tinnitus on the right side ; deglutition difficult; articulation impeded. In attempting to walk he has a tendency to fall *forward* and to the *left* side. He has every day from two to four attacks of *petit mal*. At the commencement of each of these attacks there is a nystagmatic movement of the left eye, with a strong contraction of the external rectus ; frequently there is an involuntary discharge of urine and faeces. The pulse is *irregular* and intermittent. The appetite is, at times, voracious.

Though closely questioned and examined, the fact of a syphilitic taint could not be established. Treatment consisted mainly of cathartics, mercury, and potassa iodide.

An ophthalmoscopic examination revealed a swollen condition of both discs ; more pronounced on the left side. The state of vision I was, on account of his stupid condition, unable to determine with any accuracy. No complaint had, however, up to this time, been made as

to the right eye. Neither could I, for the same reason, mark the diminution of hearing power on the right side. There was a paretic condition of the orbicularis of the right eye which allowed the lower and outer quarter of the cornea to be constantly exposed. At the time of my first examination, there was no trouble with the cornea or conjunctiva.

Five weeks subsequently, I was again asked by Dr. B. to see the patient on account of an ulcerative action which had recently set in on the right cornea. I saw him on a Tuesday, and learned that on the Friday previous a redness of the conjunctiva had been noticed, limited to the lower and outer portion of the globe, and corresponding to the unprotected part. The doctor saw it on Sunday, and noted at this part a slight haziness of the cornea. When I saw him, there was a sloughed condition of the cornea, embracing its lower and outer quadrant and an infiltration of tissue, extending one millimetre around it. No pain was complained of. I closed the eye with a bandage, but the sloughing process progressed in spite of this, and in a week the whole of the cornea was gone. A few days thereafter he died quietly.

A SECTIO CADAVERIS was made on the 19th of August, sixteen hours after death, by Dr. B., myself, and a medical student. Body much emaciated; *rigor mortis* well marked; right eye open, left closed. On laying open the calvarium, the membranes were found to be in a healthy condition, as was also the cerebrum. The left cerebellum seemed to be softer in consistency than the right. On the right side was found a *tumor* resting on the under surface of the cerebellum and extending forward on the pons varolii. It had formed a kind of nest for itself in the cerebellar substance, though it was not, strictly speaking, encysted. The surrounding brain-matter was somewhat softer than the other portions.

The tumor was triangularly pyramidal in shape, and measured at its base, on two sides, 3 centimetres, and on the other 2.4 centimetres; its height was 2.6 centimetres. From its position it exerted more or less pressure on all the cranial nerves on the right side, at their emergence from the medulla posterior to the third. The right ventricles contained about twice the usual quantity of fluid.

Both eyes were removed. On viewing the optic nerves *in situ* at their entrance into the globe, there was no appreciable distention of their sheaths, and no fluid escaped when they were severed. The eyes and the tumor were placed in Müller's fluid.

Two months after, the hardening of the tumor was completed in alcohol, and sections were made. It was found to be very vascular, the vessels varying in size from very small capillaries to those capable of being discovered by the naked eye. Its cellular element was abundant. The cells were round, had large and well-marked nuclei, and were surrounded by a thin cell-wall; many free nuclei were found scattered among the other elements. The intercellular tissue was not very abundant, and was composed of cellular-tissue fibres. At first glance, it might be mistaken for a glio-sarcoma of Virchow, but a number of examinations convinced us that the granular-like bodies were simply the nuclei of the cells which had been set free through a rupture of delicate cell-wall, from handling. We think, therefore, there can be no difficulty in classing it among the *round-cell sarcomata*.

When the eyes had become sufficiently hard to allow of sections being made, the right was examined microscopically; the posterior portion of the left being preserved as a macroscopic specimen. The optic discs were very prominent, and in the left eye the retinal veins were quite well preserved; they were tortuous, and at two places a rupture had occurred, producing an extravasation of blood of about twice the size of a retinal vein of the first magnitude. Sections through the nerve and disc showed, up to the lamina cribrosa, no appearances of pathological alteration in the nerve or its sheath.

The morbid appearances were confined wholly to the disc anterior to the lamina, and the retina in its immediate vicinity. The swollen condition of the disc was due to an increase in the quantity of connective tissue and the number of blood-vessels, scattered among which was a large quantity of small round cells. The optic-nerve fibres were not anywhere observed to be altered in their appearance from that usually seen in a normal condition; the varicosities which have some-

times been reported in similar conditions being notably absent.

Sections were also made through the anterior portion of the right globe, embracing the ciliary region, iris, and pupillary space. The pupillary space was filled with a firm substance, to the posterior surface of which and the iris, the anterior capsule of the lens adhered. No remains of the true corneal tissue was left. It is worthy of remark that the ulcerative action stopped abruptly at the scleral border, the edge of the sclerotic presenting a concavity looking outward, which would seem to substantiate the view that the sclerotic and cornea are not the same tissue modified, but distinct tissues, with probably different sources of nutrition.

Under the microscope the exudation in the pupillary space was seen to be composed of round cells closely packed together, so as, in a greater portion of the mass, to appear a homogeneous substance. On teasing, however, a number of cells were isolated which had preserved their form perfect.

The pupillary edge of the iris was not sharply defined, but merged itself into this mass, and the pigment was, in its immediate neighborhood, profusely scattered throughout the other elements of the substance. Among these cells a number of fibres were seen running longitudinally, the exact character of which was not determined. On the posterior surface of the lens-capsule, which closely adhered to the posterior surface of the iris and the substance in the pupillary space, were seen a number of epithelial cells belonging to the capsule, which were quite healthy in appearance. The tissue of the iris itself was infiltrated with round cells.

We do not propose to enter into a detailed discussion of the two questions which this case brings prominently forward. We shall simply point out those facts which it offers in support of some of the different theories advanced, respecting the pathological conditions found; and firstly those regarding *sloughing of the cornea*.

In considering the question of corneal inflammation found in connection with intracranial lesions, it would be well, we think,

not to attach too great importance to the experiment of section of the trigeminus in lower animals, and this for two reasons: 1st, Because it is not always safe to suppose the conditions of nutrition are precisely the same in animals occupying such widely different positions in the scale of existence. We are warranted in this caution by the established fact, that many remedies have not the same degree of effect in man as in the lower animals, and also by the fact which has been brought out in experiments conducted with a view to determining this very matter, that the effect of operations varies greatly, even in the different lower animals. While, therefore, we may accept the results of such experiments as throwing light upon the subject, we should not, by any means, take them as conclusive. 2d, We are not at all certain that, in cases of cerebral tumor, for instance, the lesion is confined solely to the fifth pair. In fact, most of the cases that have been reported show an involvement of other nerves in addition to the trigeminus. We should, therefore, not accept unreservedly the results of section of this nerve alone as facts on which to base a pathogenesis of the morbid condition as found in man.

As is well-known, the two principal theories on the cause of keratitis from implication of the trigeminus are, the neuro-paralytic, sustained by Schiff and his followers, and the traumatic, contended for by Snellen and others.

Looked at in the light of more recent observations and experiments, it would seem that, while neither contains the whole truth, there is a quantity in both. In the case above reported, the sensibility was not entirely lost, and the exposure to traumatic injuries was not great, since the lids could be brought almost together.

It seems highly probable, then, that it was a combination of the two causes which brought about the corneal trouble in this case. The vitality of the cornea was lowered by morbid processes at work at the root of the trigeminus, and it was thus less able to resist the traumatic influences to which it was subjected, on account of its exposure through paresis of the seventh pair.

This is Buttner's opinion, and it seems supported by observations made on other portions of the body. Dr. Mason says (*Trans. Amer. Neurolog. Ass.*, 3d Ses., 1877): "In Dr. Brown-Séquard's laboratory I have repeatedly seen guinea pigs, whose sciatic nerves had been cut, remain indefinitely without ulcerations of the feet; but if those animals were neglected and the feet allowed to remain in filth and urine, frightful ulcerations ensued."

As regards this vaso-motor derangement (for such it evidently is), all the facts in the case reported seem to support the view of Merkel (*Graefe u. Saemisch*, Bd. 1). He maintains that the trophic branch of the fifth pair has its origin under the anterior pair of the tubercula quadrigemina, and forms the medial side of the trunk of the nerve. Meynert (*Stricker's Handbook*) had already traced one root of the trigeminus to this locality. This view is quite in harmony with the experiments of Meissner (*Zeitschr. f. rational. Med.* 3d Series. Bd. XXIV., p. 96), who found that, when the medial portion of the nerve remained undivided, no trophic changes were noticeable, but that, on section of this portion, even though the sensibility of the cornea was not affected, keratitis immediately set in. In the above case, we can readily suppose that the changes due to pressure had extended to this root, or to the fibres coming from it, and in this manner brought about a modification in the nutrition of the cornea.

On the second question—the *papillitis*, our case does not shed a great amount of light, except in so far as it shows that the theory of Schwalbe-Mainz cannot be applied to all cases. We made careful examination for distention of the optic-nerve sheaths by fluid, but in vain. Neither was the amount of fluid in the brain enough to have caused a congestion of the cavernous sinus sufficient to alone have caused the choked disc.

The objections to these two theories are so well known as to require no repetition here. In such cases, we certainly have a right to look for something more than a mere mechanical obstruction to the circulation as a cause for a proliferative inflammation confined to the surface of the optic disc. We

would naturally look, under such circumstances, for some interference in the nutrition of the part. When we have that, then those other causes—congestion of the cavernous sinus, and pressure from distention of the nerve sheath may act, like the traumatic influences in the paralyses of the fifth pair, as exciting and aggravating causes.

Provisionally, therefore, the reflex theory of Benedikt may be looked upon as the one best adapted to explain the origin of the trouble.

APRIL 5, 1878.

